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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,502	11/26/2003	Benjamin Charles Nuttall	C-2725	8956

7590 11/22/2005  
StephenA. Schneeberger  
49 Arlington Road  
West Hartford, CT 06107

EXAMINER
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ALEJANDRO, RAYMOND

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 11/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/723,502

Applicant(s)

NUTTALL ET AL.

Examiner

Raymond Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/26/03</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statement (IDS) submitted on 11/26/03 was considered by the examiner.

### *Drawings*

2. The drawings were received on 11/26/03. These drawings are acceptable.

### *Specification*

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

### *Claim Rejections - 35 USC § 112*

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 14-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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6. Claim 14 is indefinite as the recitation "*the temperature threshold is in the range of about 85 to 95 °F*" renders the scope of the claim vague and unclear. For instance, if water injection takes place when the temperature exceeds a threshold (see claim 13), thus, it is unclear whether water is injected specifically when the temperature exceeds 85°F per se, or exceeds 95 °F or just any temperature falling between about 85 to 95 °F. Applicant is reminded that the term "exceeds" only encompasses to be greater than or to go beyond a set limit and cannot cover a range. Further clarification is required.

7. Claim 15 recites the limitation "the condition" in line 3. There is insufficient antecedent basis for this limitation in the claim.

8. Claim 17 recites the limitation "the level of coolant" in lines 3-4. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1-3 and 9-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Grasso et al 6274259.

The present application is directed to a fuel cell power plant wherein the claimed inventive concept comprises the energy recovery device in combination with the specific injection means.

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As to claims 1 and 11:

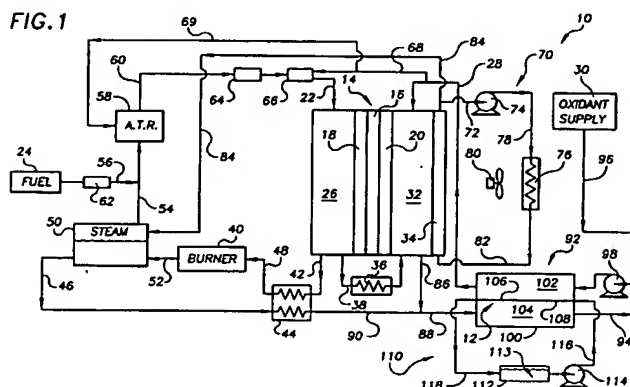
Grasso et al disclose a fuel cell power plant that generates electrical energy from a process oxidant stream and a reducing fluid stream comprising at least one fuel cell means for producing the electrical energy (CLAIM 1). Disclosed is the latent and sensible heat of the exhaust stream (COL 11, lines 50-55). Grasso et al also disclose a direct mass and heat transfer devices (*the energy recovery device*) secured in fluid communication with both a primary oxidant inlet line that directs the process oxidant stream into the fuel cell means and also with a plant exhaust passage that directs a plant exhaust stream out of the fuel cell means (CLAIM 1 /COL 7, line 55 to COL 8, line 50). The device includes a fine pore enthalpy exchange barrier in mass transfer relationship between the oxidant and exhaust streams passing through the device so that the process oxidant stream passes adjacent an inlet surface of the barrier and the plant exhaust stream passes adjacent an opposed exhaust surface of the barrier (CLAIM 1/ COL 7, line 55 to COL 8, line 50). Grasso et al inherently encompass the operation (*the method*) of the fuel cell plant using the energy recovery device (COL 11, lines 48-67/CLAIM 25).

Grasso et al further disclose that the mass and heat transfer device means may include a liquid transfer medium supply means for supplying a liquid transfer medium thereto (COL 8, lines 33-50). Disclosed is that transfer feed line 116 is in fluid communication between the reservoir 112 and the barrier 12 (COL 8, lines 33-50). Water may be the liquid transfer medium (COL 9, lines 52-60). *Thus, the examiner sets forth that Grasso et al's liquid transfer medium supply means serves as the claimed injection means disposed to inject a liquid medium thereinto.*

**Examiner's note:** *the claim language "injection means disposed to inject a liquid" has not been construed as invoking the 35 USC 112, 6<sup>th</sup> paragraph because it does not meet at least*

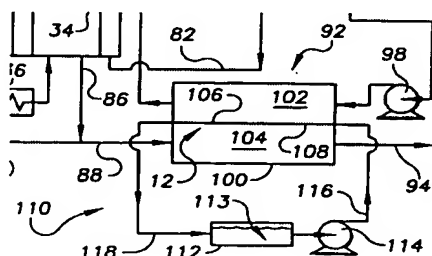
*Particularly, it does not satisfy the requirement that the claim limitations must use the phrase “means for” as well as that the phrase “means for” must not be modified by sufficient structure, material or acts for achieving the specified function.*

**Figure 1** below illustrate the fuel cell power system including the fuel cell unit and the energy recovery device and the injection means:



Concerning claims 2-3:

As evident from enlarged portion of Figure 1 below, the energy recovery device include the oxidant chamber 102 for receiving oxidant through inlet line between chamber 92 and blower 98; the transfer medium feed line 116 for introducing a liquid medium into chamber 102 and positioned immediately upstream of the inlet line (SEE Figure 1). Water may be the liquid transfer medium (COL 9, lines 52-60). *It is also contended that the inlet regions of both the oxidant the liquid transfer medium encompasses the plenum.*



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With respect to claim 9-10:

Grasso et al disclose the use of a fine pore enthalpy exchange barrier including a support matrix means (COL 8, lines 52-55) wherein such support structure matrix means include porous graphite layers; porous graphite polymers layers; inorganic-fiber thermoset polymer layers, glass fiber layers and synthetic-fiber filter papers treated to be wettable, porous metal layers, perforated metal layers and the like (COL 9, lines 30-40).

Thus, the claims are anticipated.

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 4-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grasso et al 6274259 as applied to claims 2-3 above, and further in view of Saito et al 2002/0009625.

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Grasso et al is applied, argued and incorporated herein for the reasons above. However, the preceding reference fails to expressly disclose the specific spray nozzles.

Saito et al disclose a fuel cell power plant including a mass and heat recovery device (ABSTRACT). Saito et al illustrate an embodiment using a spray nozzle assembly 86 being specifically oriented and controlled to discharge a predetermined amount of moisture into the exhaust gases prior to directing the exhaust gases through the ERD 95 (P. 0060).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the specific spray nozzle of Saito et al in the fuel cell power plant of Grasso et al for the benefits of maintaining an adequate moisture level in both the inlet oxidant stream and the ERD (P. 0060). Yet further, the spray nozzle advantageously protects the RED from mechanical damage due to dry-out or overheating (P. 0060).

14. Claims 6-7 and 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grasso et al 6274259 as applied to claims 1 and 11 above, and further in view of Dickman et al 6465118.

Grasso et al is applied, argued and incorporated herein for the reasons above.

As to claim 17:

Additionally, Grasso et al disclose a coolant plate means for removing heat from the fuel cell (COL 6, lines 4-15).

However, the preceding reference fails to expressly disclose the specific controlling means/step and the specific temperature threshold.

Regarding claims 6-7, 12-13 and 15-17:



Dickman et al teach a system and method for recovering thermal energy from a fuel processing system comprising a fuel cell stack (TITLE/ABSTRACT). In particular, Dickman et al teach a control system 90 including a controller 92 that directs operation responsive to programmed instruction and/inputs from sensors and user inputs. Controller 92 communicates with a sensor assembly 94 that monitors such variables as the temperature and fluid level in vessel 86. For example, if the temperature of the fluid is hotter than a desired temperature, either additional fluid may be added from a supply or the rate at which the fluid is recycled may be slowed or stopped to allow the fluid to cool; on the other hand, if the temperature of the fluid is lower than desired, the recycle rate may be increased within acceptable limits, some of the stored fluid may be removed (COL 5, line 64 to COL 6, line 15/ COL 7, lines 5-26). Controller 92 may also receive inputs from sensors and controllers including a sensor that measures the rate of operation of the fuel processor or a sensor that measure the rate of operation of the fuel cell stack and adjust such rates (COL 6, lines 17-27).

In reference to claim 14:

Dickman et al disclose heating to temperatures from approximately 50-115 °F (COL 7, lines 28-34). *Given that Dickman et al suggest heating temperatures including the claimed temperature range, it is contended that a suitable temperature threshold falls within the temperature range disclosed by Dickman et al.*

In light of these disclosures, it would have been obvious to those of ordinary skill in the art at the time the invention was made to employ the specific controlling means/step of Dickman et al in the power system of Grasso et al as Dickman et al clearly teach that such specific controlling means/step permits to precisely direct the operation of the system responsive to

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programmed instructions and/or inputs such that operating variables may be monitored, controlled and adjusted. Accordingly, operation of the power system is greatly improved. Yet further, by using Dickman et al's controlling means/step, the energy requirements of the power system are reduced, and thermal and/or electric loads of the system can be optimized and effectively used within the normal/standard capacity of the power system.

With respect to the specific temperature threshold, it would have been obvious to those of ordinary skill in the art at the time the invention was made to set the temperature threshold of Grasso et al to include any of the temperature values disclosed by Dickman et al's and particularly within the claimed temperature threshold because Dickman et al disclose heating to temperatures from approximately 50-115 °F (COL 7, lines 28-34). Thus, Dickman et al's teachings encompass specific working temperatures for recovering heat and directly teach operation of their power plant within the claimed temperature range. *Still further, it is noted that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed.Cir. 1990).*

15. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grasso et al 6274259 in view of Dickman et al 6465118 as applied to claim 6 above, and further in view of Balasubramanian et al 6617065.

Grasso et al and Dickman et al are applied, argued and incorporated herein for the reasons above. Nonetheless, the preceding references fail to expressly disclose the specific temperature and humidity sensors.

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Balasubramanian et al teach a method and apparatus for maintaining neutral water balance in a fuel cell system (TITLE/ABSTRACT) and such neutral water balance is accomplished via control systems that monitor ambient parameters and fuel cell parameters such as temperature and humidification (COL 4, lines 14-25).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the specific temperature and humidity sensors of Balasubramanian et al in the fuel cell power plant of Grasso et al-Dickman et al as Balasubramanian et al teach that by specifically using temperature and humidity sensors to monitor ambient parameters and fuel cell parameters such as temperature and humidification, neutral water balance is accomplished, thereby fuel cell operation and power output is enhanced.

### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro  
Primary Examiner  
Art Unit 1745

  
**RAYMOND ALEJANDRO**  
**PRIMARY EXAMINER**